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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/012,674 01/23/98 PRATER

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EXAMINER

SEALEY,

ART UNIT

PAPER NUMBER

2671
DATE MAILED:

21
06/20/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

SM

Office Action Summary

Application No.

09/012,674

Applicant(s)

Prater

Examiner

Lance Sealey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 21, 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-10 is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other: _____

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DETAILED ACTION

Allowed and Allowable Subject Matter

1. Claims 7-10 are allowed because no prior art anticipates or suggests a plurality of hemispherical light sources of finite radius; however, the examiner reserves the right to withdraw the allowance of these claims pending translation of Japanese Patent 60-025405, the abstract of which is included in this Office action, or the appearance of any other art that might fulfill claim 7.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishita et al., "Continuous Tone Representation of Three-Dimensional Objects Illuminated by Sky Light" ("Nishita") in view of the Persistence of Vision(tm) Ray-Tracer software ("POV-Ray").

4. POV-Ray discloses:

- (claim 1) constructing a plurality of finite light sources within a computer animated scene, each of the finite light sources having a finite size and center (4.6.6); and

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- (claim 1) constructing a plurality of surfaces within the scene, each surface consisting of a plurality of points (4.6.5; implied by discussion of the behavior of light around objects, which have a plurality of surfaces).

4. However, POV-Ray does not disclose the approximation of the illumination effect of each of the finite light sources, or a hemispherical light source, by the use of a plurality of point light sources of varying intensity; a situation wherein each of the finite light sources illuminates each of the points; the approximate calculation of a light intensity and light vector direction as a function of the portion of each of the light sources which illuminates each of the points; approximating the light vector direction as a function of the portion of the light source which shines upon a point; and the situation in which the finite light source is a hemisphere of infinite radius of a sphere.

These elements are disclosed by Nishita.

5. Nishita, in disclosing an improved model for natural lighting calculations that adequately considers both direct sunlight and skylight, also discloses:

- (claim 1) approximating an illumination effect of each of the finite light sources by the use of a single point light source of varying intensity (Nishita discloses approximating an illumination effect of each of the finite light sources at p.125, second column, last paragraph. POV-RAY, at 4.6.2, teaches that point light is infinitely small and invisible. Because point light does not exist in the real world, a point light source must be approximating a real, finite light. Tips supplied in Appendix F.2 of POV-Ray also suggest simplifying the scene or lighting calculations to aid in

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debugging. Therefore it would be obvious to replace the Nishita area light with the POV-Ray point light because this would have the effect of simplifying the scene during debugging, and accordingly, both POV-Ray and Nishita together disclose this element of claim 1);

- (claim 2) each of the finite light sources illuminates each of the points (p.125, second column, last paragraph);
- (claim 3) the approximate calculation of a light intensity and light vector direction as a function of the portion of each of the light sources which illuminates each of the points (FIG.4(a), p. 128; note arrows that indicate the direction of skylight being projected on the surface);
- (claim 4) calculation of the light intensity as a function of the portion of the light source which illuminates each of the points (p.125, second column, last paragraph);
- (claim 5) approximation of the light vector direction as a function of the portion of the light source which shines upon a point (FIG.4(a), p.128);
- (claim 6) the finite light source is a sphere (the sun; p. 125, second column, third paragraph);
- ~~(claim 7) constructing a hemispherical light source of infinite radius (p.125, second column, fourth paragraph, second sentence);~~

6. Therefore, it would have been obvious to one of ordinary skill in the art to have used the Nishita point model of skylight in the POV-Ray ray tracing program. Such a modification to

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Nishita would provide a more realistic simulation of outdoor scenes (see POV-Ray, 4.6.5, first paragraph, from the second to the next to the last sentence).

Response to Remarks

7. As a result of applicant's arguments, more references from POV-Ray have been added to further clarify the Office's position regarding this application.

Conclusion

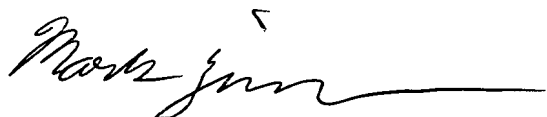
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lance Sealey whose telephone number is (703) 305-0026. The examiner can normally be reached Monday-Friday from 7:00 am to 3:30 pm EDT.

9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached on (703) 305-9798. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

10. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700 or the Customer Service Office at (703) 306-0377.

LWS

June 18, 2001


MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600